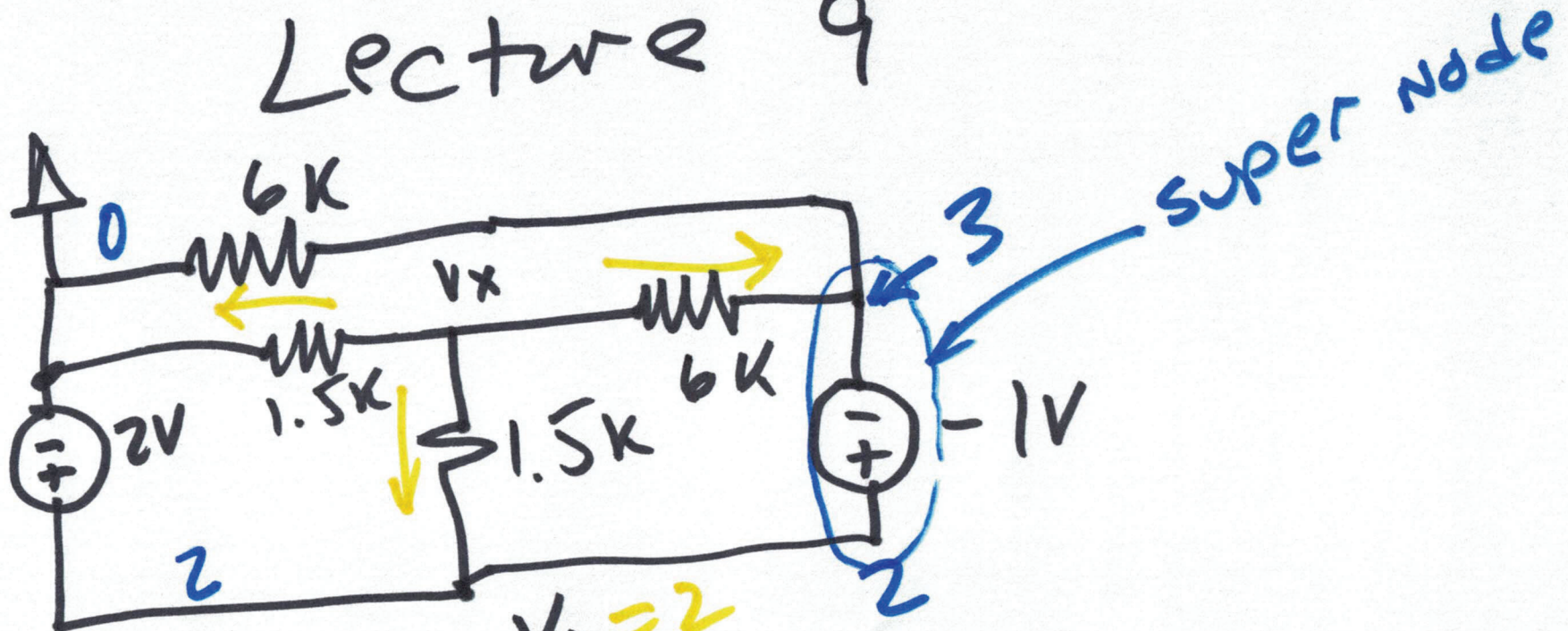


# EE 220 Circuits I

Sept. 28, 2022

## Lecture 9

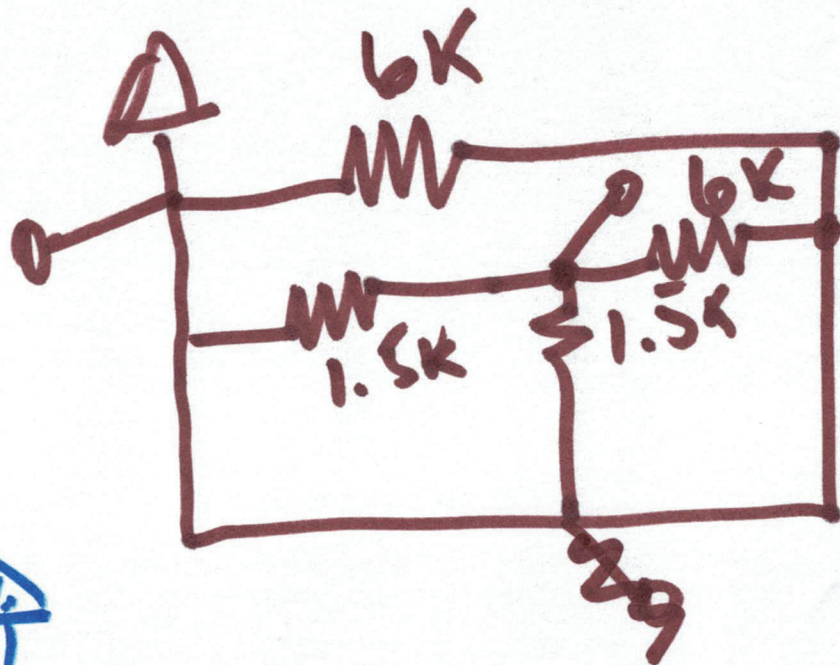


$$\frac{v_x - 0}{1.5k} + \frac{v_x - 2}{1.5k} + \frac{v_x - 3}{6k} = 0$$

$$4v_x + 4v_x - 8 + v_x - 3 = 0$$

$$9V_x = 11$$

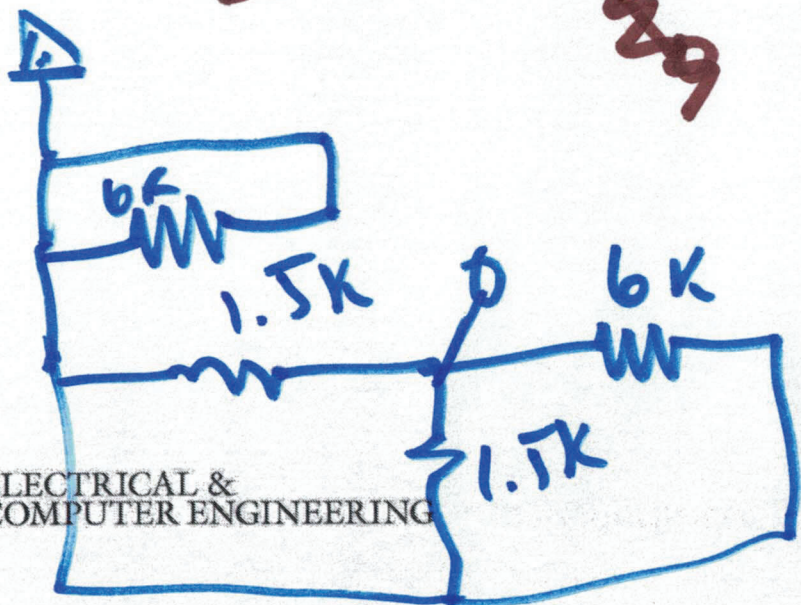
$$V_{TH} = V_{oc} = V_x = \frac{11}{9} = 1.22V$$

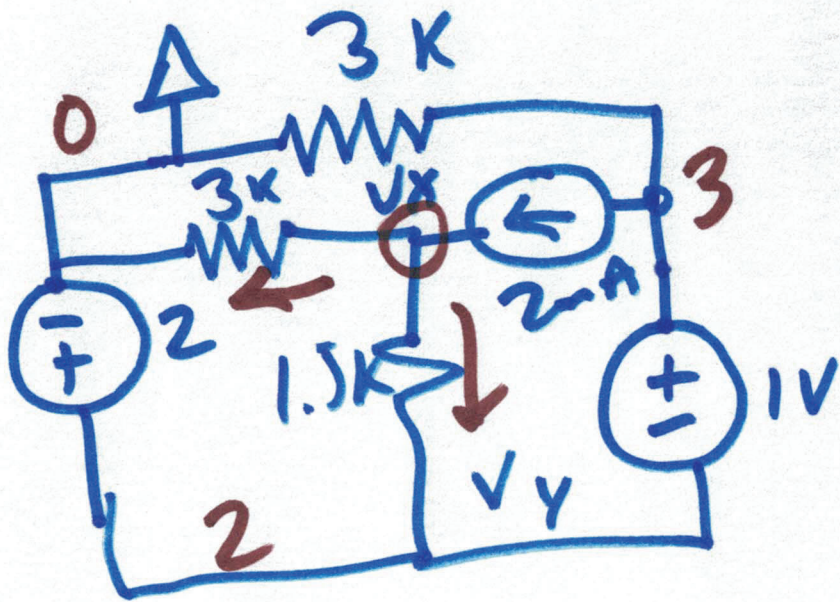


$$R_{TH} = 1.5k \parallel 1.5k \parallel 6k$$

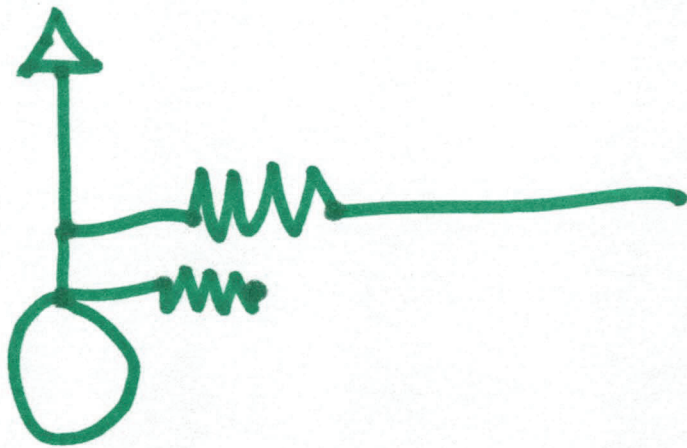
$$= 750 \parallel 6k$$

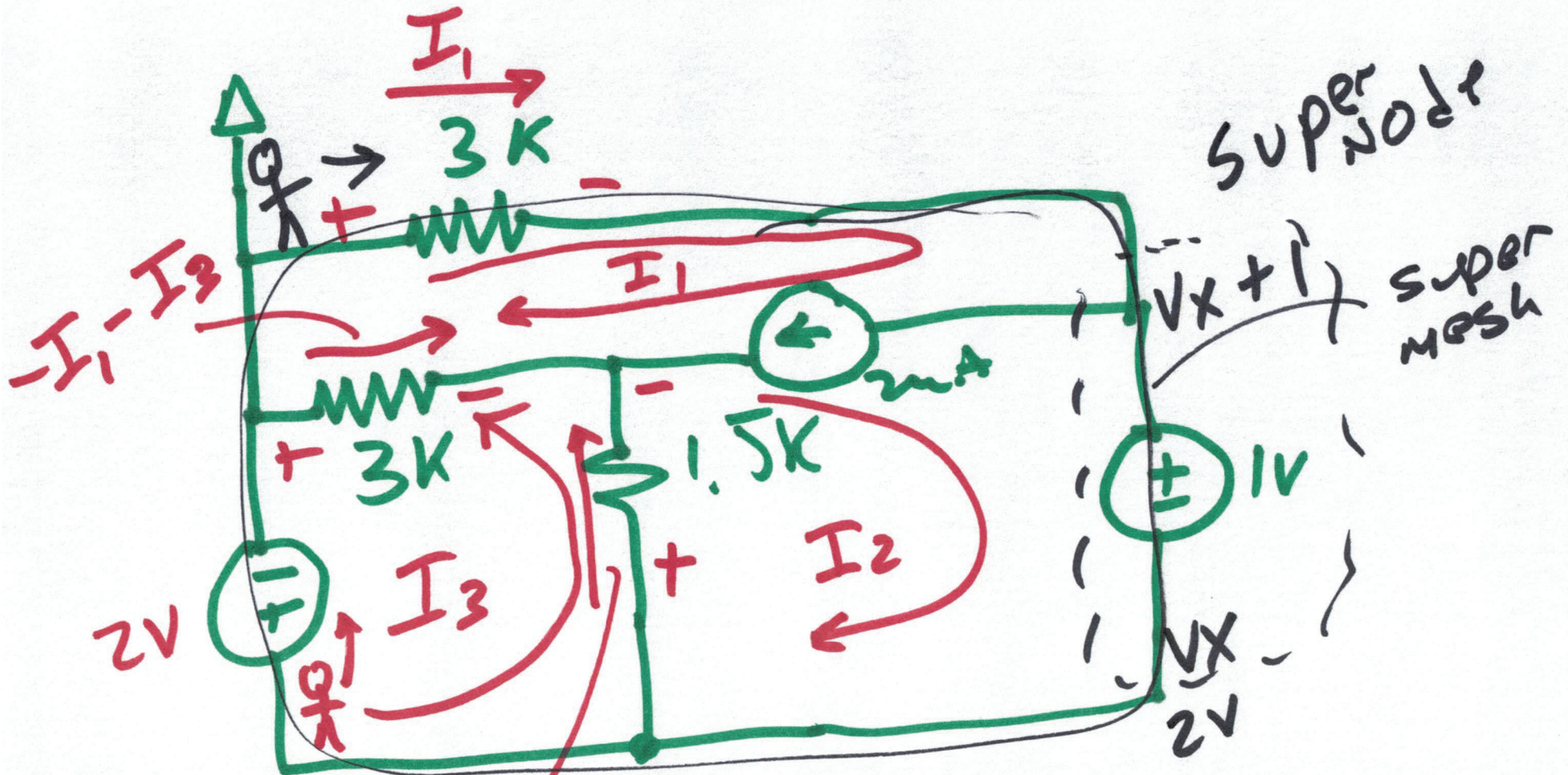
$$R_{TH} = 666\Omega$$





$$2\mu\text{A} = \frac{V_x - 0}{3\text{k}} + \frac{V_x - 2}{1.5\text{k}}$$





$$I_3 + I_2$$

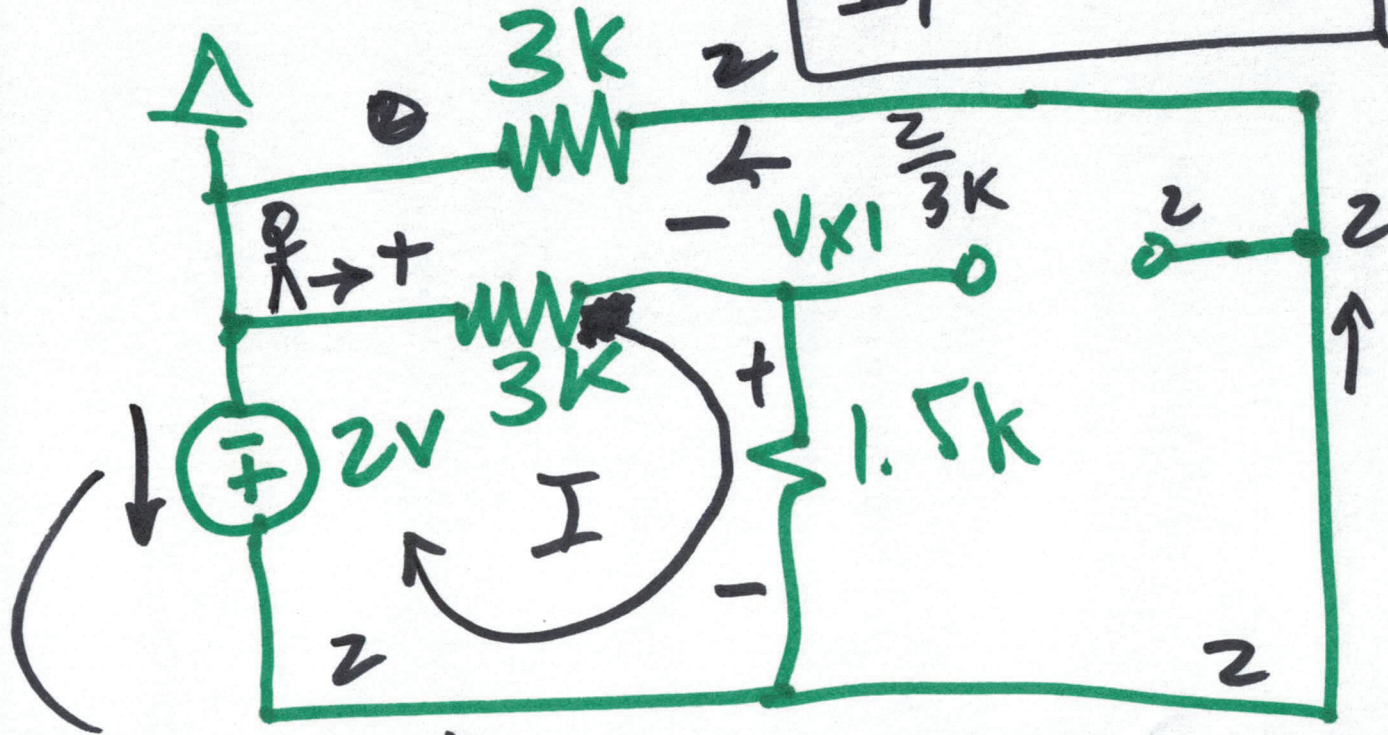
$$2mA = I_1 - I_2$$

$$0 = -2 - 3k(-I_1 - I_3) + 1.5k(I_3 + I_2)$$

4)

$$-3kI_1 - 1 - 2 = 0$$

$$I_1 = -1 \mu A$$



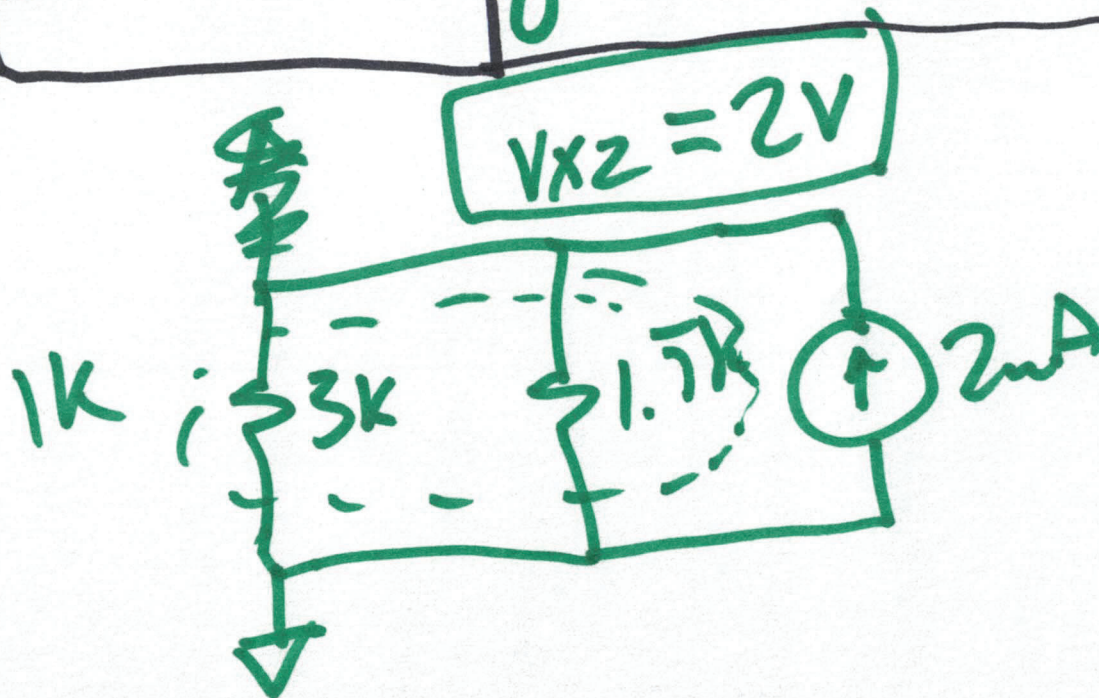
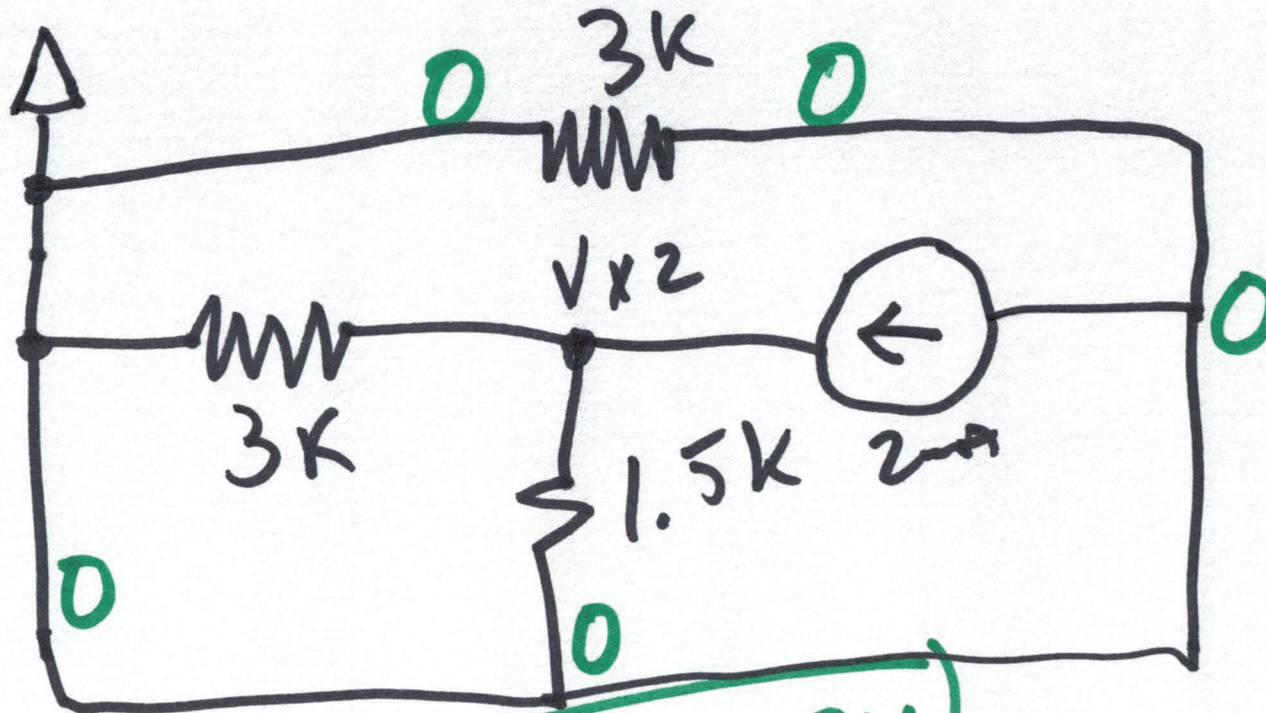
$$V_{x1} = 1.33V$$

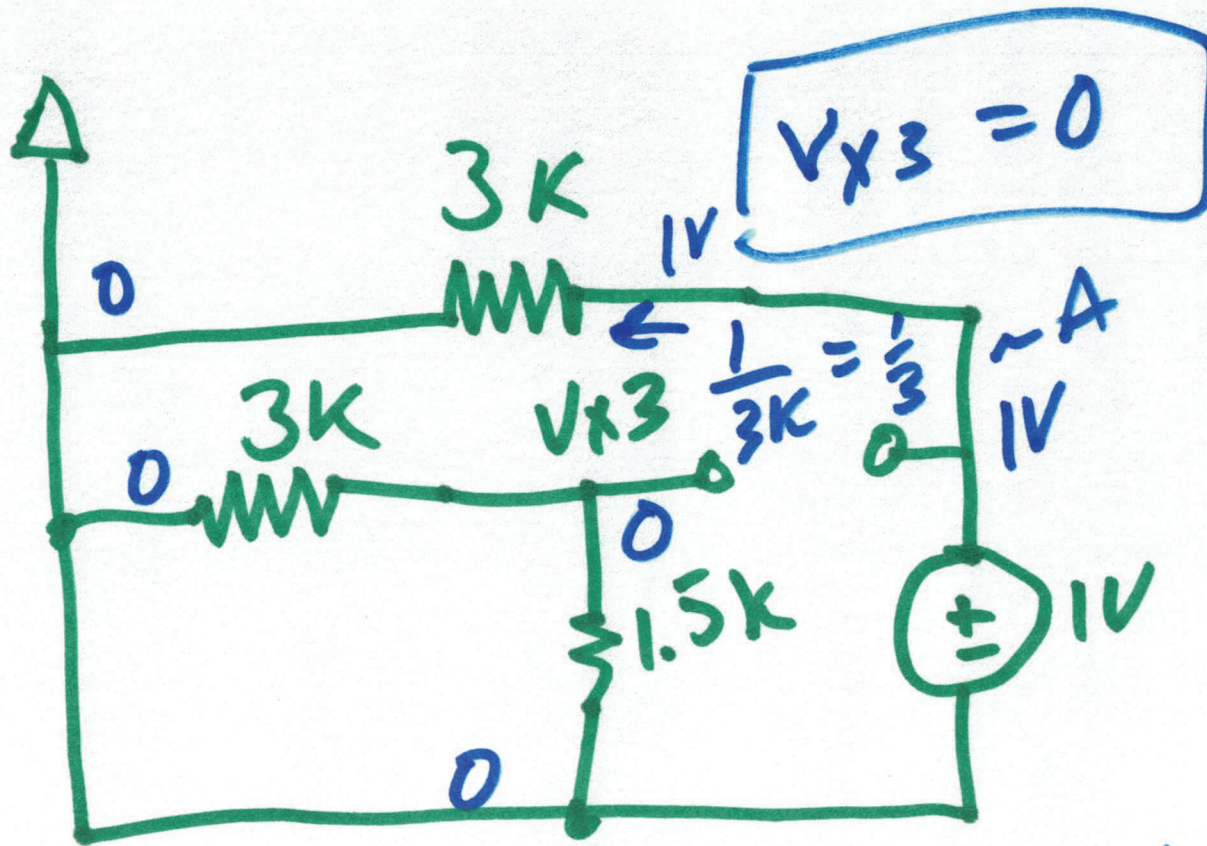
$$V_{x1} = -3kI$$

$$= \frac{12V}{9} = 1.333$$

$$\frac{4}{9} \mu A + \frac{2}{3} \mu A - 3kI - 1.5kI - 2 = 0$$

$$I = \frac{2}{-4.5k} = -\frac{2}{4.5} \mu A = -\frac{4}{9} \mu A$$

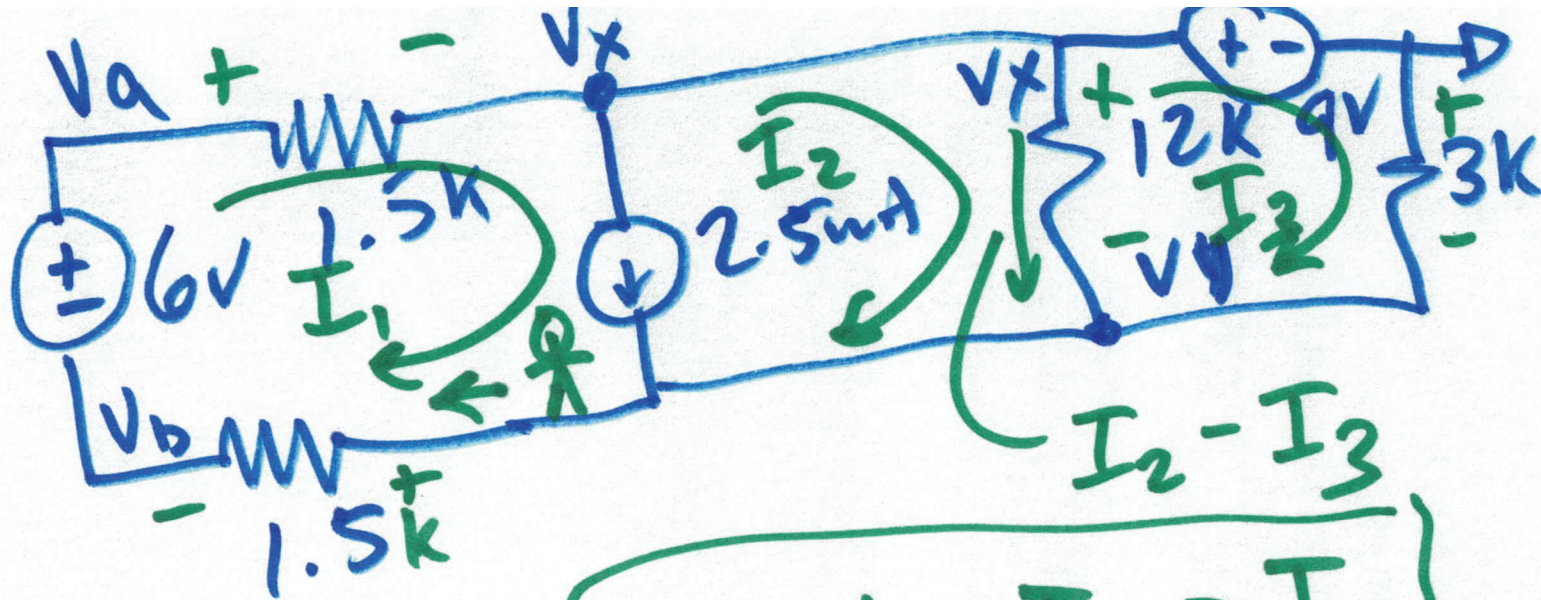




$$V_{x1} + V_{x2} + V_{x3} = V_x$$

$$1.33 + 2 + 0$$

$$V_x = 3.33V$$



$$2.5 \mu\text{A} = I_1 - I_2$$

$$+9\text{V} - 12\text{k}(I_2 - I_3) + 3\text{k} I_3 = 0$$

$$-1.5\text{k} I_1 + 6 - 1.5\text{k} I_1 - 9 - 3\text{k} I_3 = 0$$